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Brief 68-10433

NASA TECH BRIEF

An Economical Method for the Continuous Production of Iodine-123

A relatively simple and inexpensive method has been developed for producing the radioactive iodine isotope, iodine-123, in a conventional cyclotron.

Iodine-123 is a more desirable radioactive material for medical diagnoses than is the more available, and hence more commonly used, iodine-131. The shorter half-life and lower gamma ray energy (159 keV) of the 123 isotope reduces a patient's radiation exposure to less than 3 percent of that normally acquired with the 131 isotope.

The method for producing iodine-123 utilizes tellurium-122, a stable isotope available in enrichments exceeding 95 percent. The tellurium is held on a porous metal plate by a flowing stream of helium and bombarded with either alpha particles or helium-3 in a conventional cyclotron. Nuclear reactions produce xenon-123 plus other contaminating radioactive materials of which iodine-124, iodine-125, and iodine-126 are the most serious. The reaction products are continuously removed from the target by the flowing gas stream. The desirable iodine isotopes are removed by cooling the gas stream to dry ice temperature (−78°C) at which point these isotopes condense. Further cooling the gas stream to liquid nitrogen temperatures condenses the xenon-123 to permit its removal. Radioactive decay of the xenon produces iodine-123 in 4 to 8 hours.

Notes:

1. Small cyclotrons are being increasingly used in the medical field to produce medical radioisotopes. A 30 MeV helium-3 beam produced by such commercially available cyclotrons is ideal for the production method described above.
2. Iodine-123 has been produced by other methods; however, the method described above produces the highest ratio of this isotope relative to other radioactive iodine isotopes that may remain in the product.
3. No additional documentation is available. Questions may be directed to:

   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio 44135
   Reference: B68-10433

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: J. W. Blue, W. R. Smith, and V. J. Sodd
(LEW-10518)

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